

Palm-Thumb Grasp

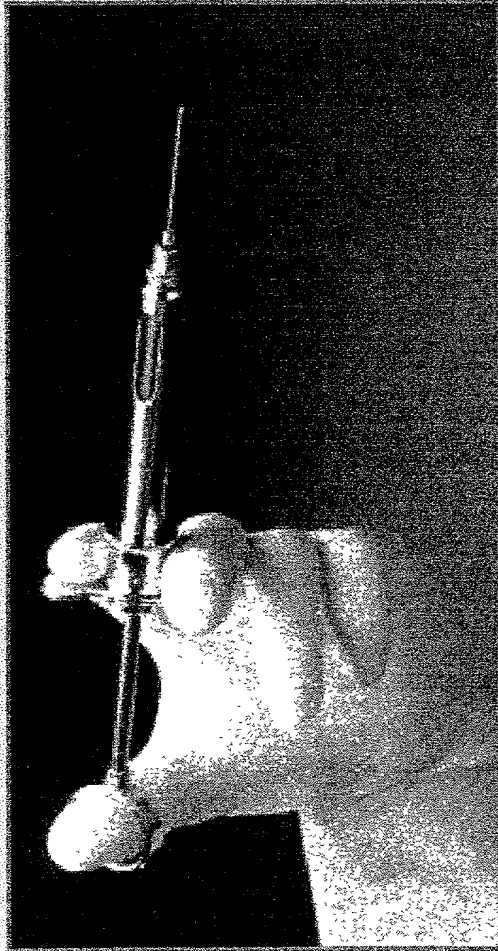
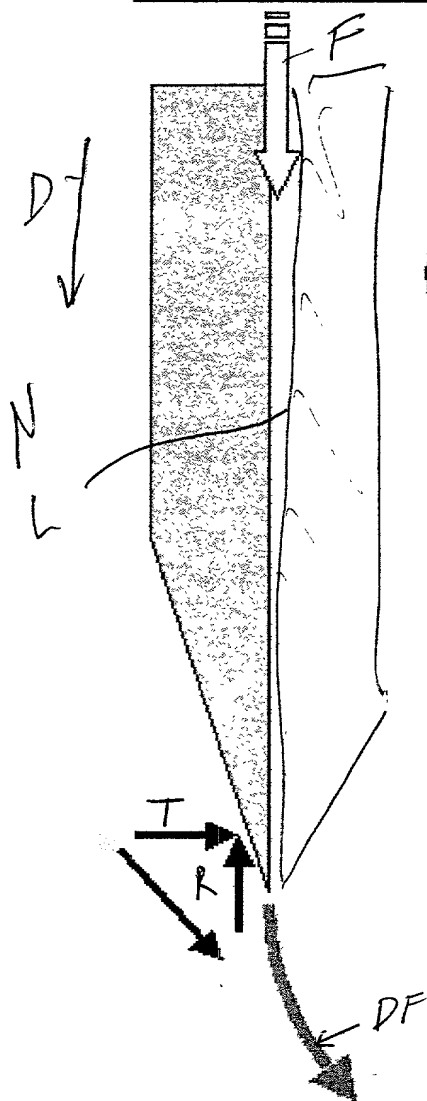


Fig. 1A
Palm-Thumb Grasp



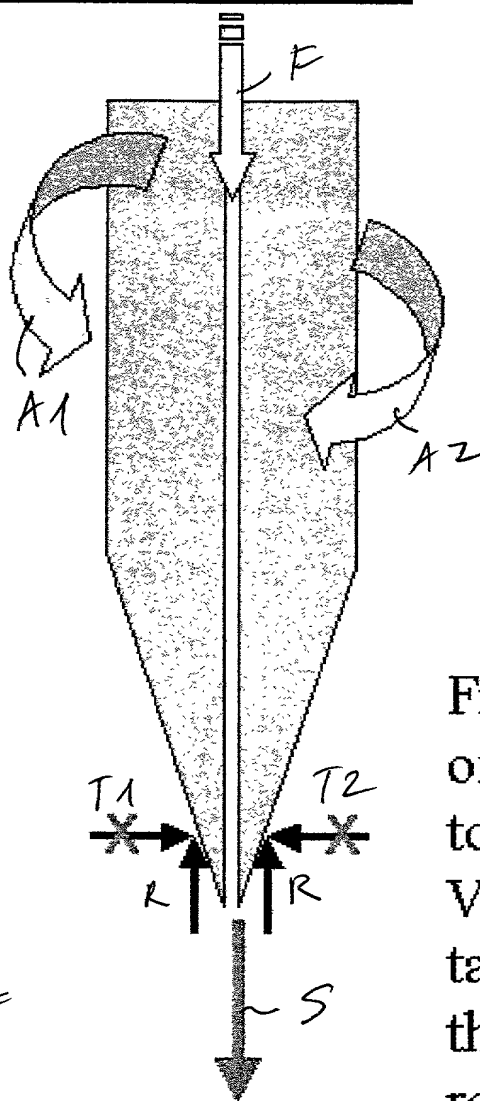
Fig. 1B
Pen Grasp
Figure 3

Insertion Techniques



Linear
PRIOR ART

FIG. 2A



Rotational

FIG. 2B

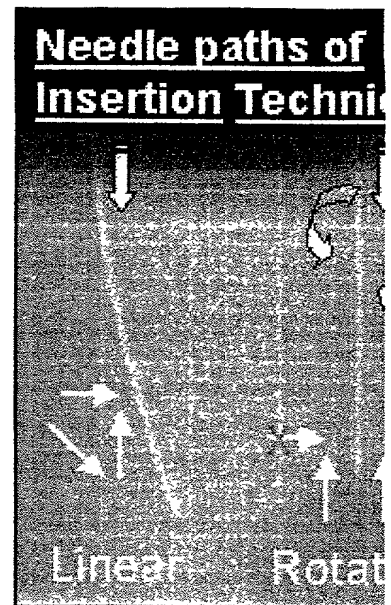


Figure 4 simplistic illustration of the vector force system to the beveled end of the needle. Vector analysis illustrates the forces taken during needle insertion in the Linear and the Bi-rotational insertion techniques.

Rotational Insertion

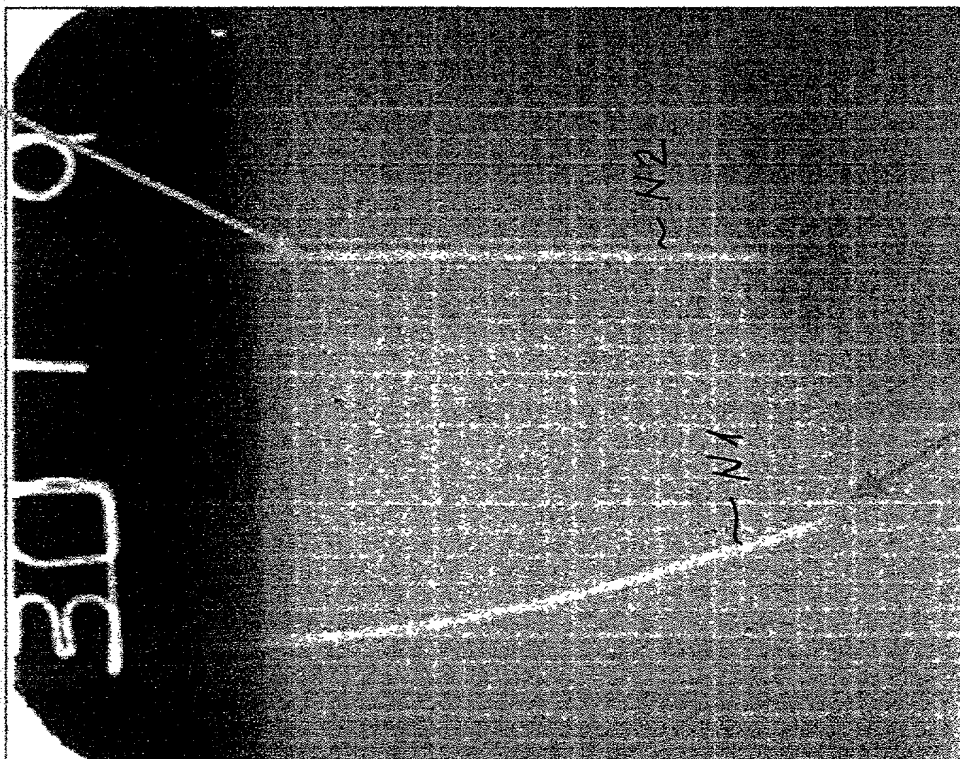


FIG. 3A

Linear Insertion

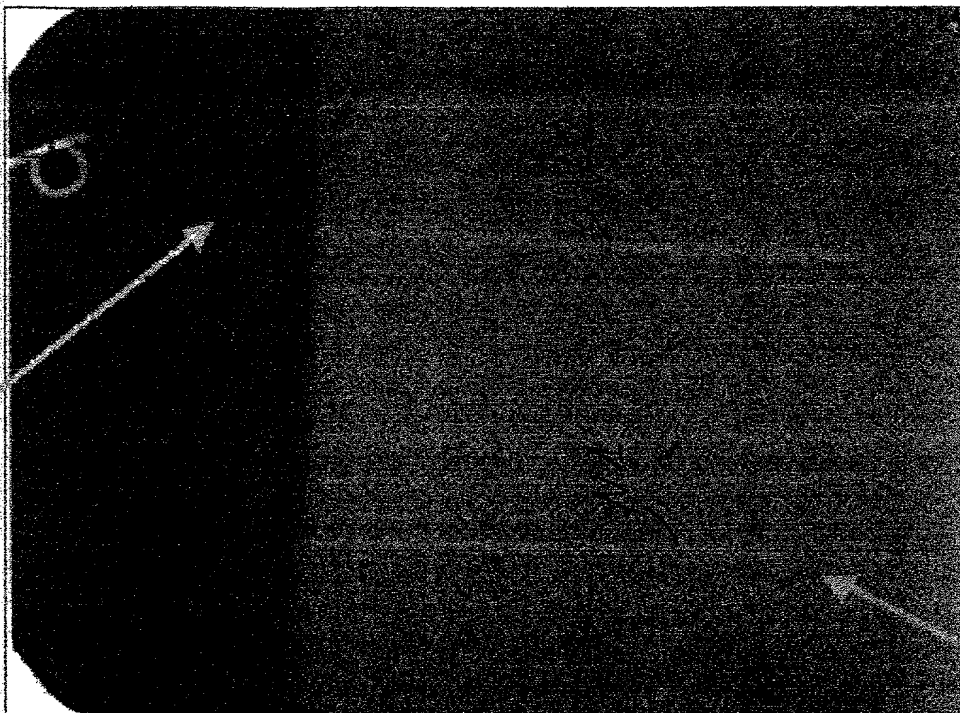


FIG. 3B

30-gauge needle

Linear vs. Bi-directional rotation Insertion

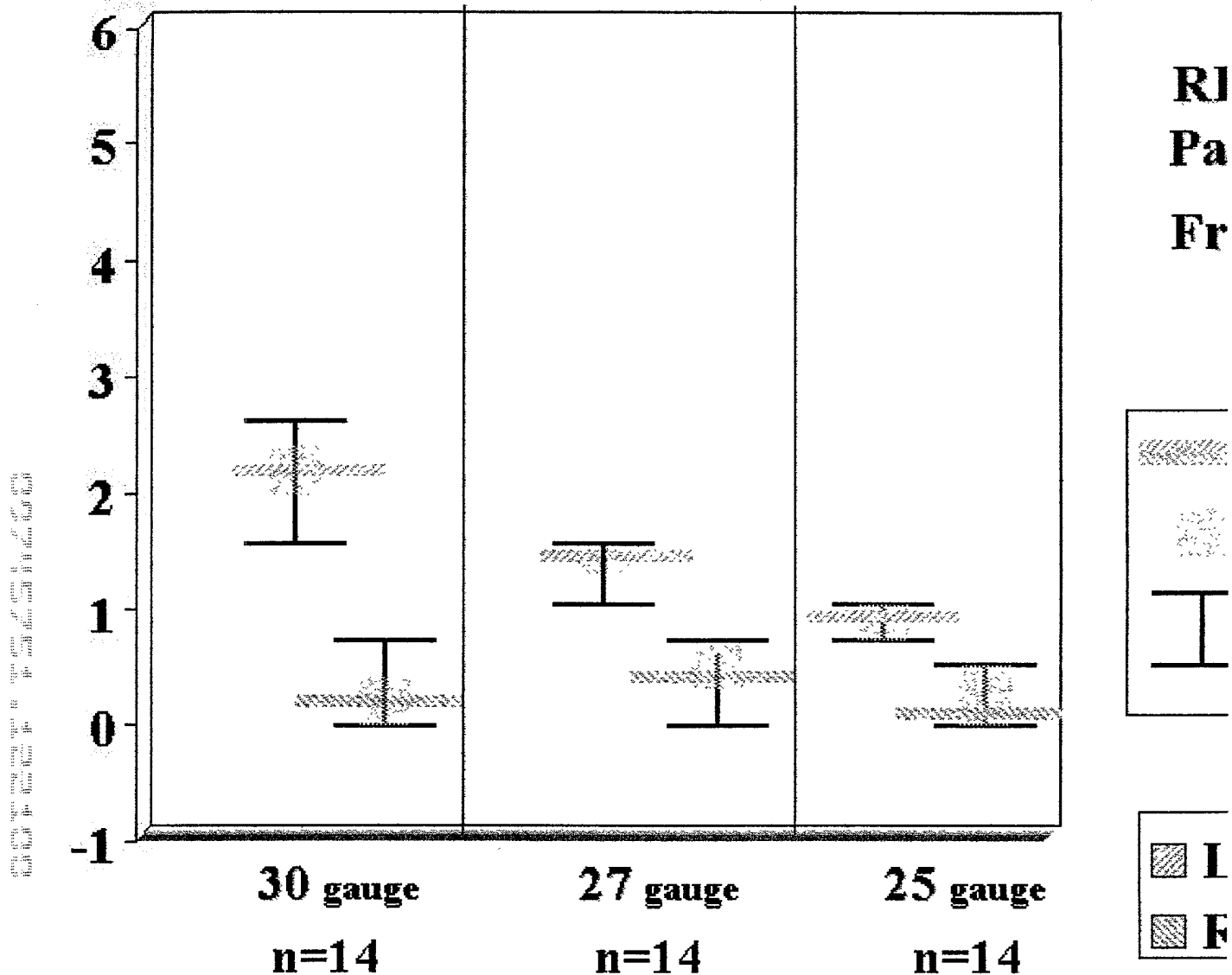


FIG. 4